Irradiance, as well as body site and timing of readings, is important in determining ultraviolet A minimal erythemal dose. (Response to Gambichler et al. July BJD)

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Dear Sir,

Irradiance, as well as body site and timing of readings, is important in determining ultraviolet A minimal erythemal dose. (Response to Gambichler *et a*l. July BJD)

Gambichler *et al*. demonstrated that, in their population, using a *25 mWcm*$^{-2}$ ultraviolet A-1 (UVA-1) source the median *24-hour* delayed minimal erythema dose (MED) on the *inner forearm* was > 130 Jcm^{-2}.[1] This differs from the 20 Jcm^{-2} to 28 Jcm^{-2} median MED reported from our centre.[2] The authors suggested the disparity might be explained by different methodologies. We agree and wish to expand on this point. Rather than being contradictory, the studies by Gambichler *et al*. and Beattie *et al*. are in excellent agreement.

The first main difference between the studies was the time when the MED was determined. Beattie *et al*. demonstrated that UVA-1 erythema peaked between 4 and 8 hours (h) with the MED being approximately half that at 24 hours.[2]

A second difference between the two studies was the site of testing. The inner forearm was tested in the Gambichler study whilst both back and inner forearm were tested in the Dundee study. Our study demonstrated that the back is around twice as sensitive to UVA1 as the inner forearm.

In recognition of this, in their discussion Gambichler *et al.* noted that their result at 24 h on the inner forearm should be compared with the Beattie result at the same time point and in the same body location, that is a median MED of 68 Jcm^{-2}.

Critical, however, is a third difference between the two studies. In a study by Kagetsu *et al*. it was demonstrated that UVA-induced erythema is irradiance dependent,[3] at 24 hour observations. They showed that a higher irradiance gave a lower MED.

The irradiance of the Gambichler *et al.* study was 25 $mWcm^{-2}$ and the Beattie study was 70 – 77 $mWcm^{-2}$. Taking the median MED from the recent study and correcting for time of observation, site of testing and irradiance of light source results in a reduction in MED from >130 Jcm^{-2} to >24 Jcm^{-2}, similar to the median MED of 20 Jcm^{-2} – 28 Jcm^{2} reported by Beattie *et al.*

This highlights that variables including body site, time point *and irradiance*, must be considered when interpreting ultraviolet threshold erythema dose characteristics.

References:

1 Gambichler T, Majert J, Pljakic A *et al.* Determination of the minimal erythema dose for ultraviolet A1 radiation. *Br J Dermatol* 2017; **177**: 238-44.

2 Beattie PE, Dawe RS, Ferguson J *et al.* Dose-response and time-course characteristics of UV-A1 erythema. *Arch Dermatol* 2005; **141**: 1549-55.

3 Kagetsu N, Gange RW, Parrish JA. UVA-induced erythema, pigmentation, and skin surface temperature changes are irradiance dependent. *J Invest Dermatol* 1985; **85**: 445-7.